RESEARCH ORDER #1
PHASE IIa - PROGRESS REPORT #2

20 DECEMBER 1954

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Research Order #1
Phase IIa - Progress Report #2 20 December 1954

This report covers the period from September 30, 1954 to December 15, 1954.

OBJECTIVE:

To design and construct two complete sets of equipment (4 units) to serve as design approval models, based upon the results of the work accomplished in Phase I.

GENERAL DATA:

The design portions of the work to be performed according to Bid Proposal No. 76-1, Phase IIa, may, as a result of the work accomplished in Phase I, be summarized as follows:

A. Design of a suitable optical system for transmitting and receiving to include the following:

   1. A light source - thirty watt tungsten lamp as previously described in Final Report of Study Phase I, dated 23 August 1954.

   2. A reflector - 8-inch diameter (6" x 6" square aperture), 6-inch focal length, circle of least confusion, approximately .030" (effective).

   3. A suitable condenser lens system, using lenses of 1.5-inch aperture and 1.5-inch focal length.

   4. A mechanical modulator, as discussed in the Final Report of Study Phase I, for modulating the light from the tungsten lamp and for operating from the transmitter amplifier.

   5. A standard "Ektron" lead sulfide cell for receiving modulated light from the transmitter and for furnishing a signal (voice modulated) to the receiver. The cells considered are 1 mm x 1 mm in dimension and have a dark resistance of approximately 400,000 ohms.

B. Design of a suitable electronic system for transmitting and receiving voice intelligence.

C. Design of a suitable power supply for the electronic system.

D. Choice of a suitable power source to furnish power to the entire system.

E. Design of a night viewer to assist in the find operation. This was decided upon as a result of our experience in field-testing a bread-board of the equipment and was confirmed by the opinion of agency personnel.

F. Design of a battery charger to be incorporated as an integral part of the equipment. This decision resulted from discussions with agency personnel.

G. Design of Mechanical System.

At this time, the work remaining to be performed according to Bid Proposal No. 76-1, Phase IIa may be defined as follows:

1. Completion of all the above design and layout work.

2. Construction of the first of four design approval models.

3. Test of the design approval model.

4. Construction of the remaining three of the four design approval models and submission of the four models for evaluation.

DISCUSSION:

Optical System.

During the period from September 30th to December 15th, the design and layout of the optical system was nearly completed. A number of parts have been purchased, and in addition our own model shop is fabricating parts at this time. It is expected that this work will be completed within the next two weeks.

Electronic System and Night Viewer.

Development work on the electronic system transmitter and receiver is completed, barring unforseen complications. Layout work on the electronic system has been completed but requires some changes due to developmental modifications. Progress is considered fairly satisfactory and the transmitter-receiver system should be in final form by January 1, 1955.

Practically all developmental work has been completed on the following, and design and layout work is in progress.

1. Vibrator power supply for the transmitter and the amplifier.

2. The battery charger and regulator.

3. Night viewer power supply.

However, further work is required on the Night Viewer, particularly in connection with the optics. It is not expected that this unit will be completed prior to January 15, 1955.

Mechanical System.

The design, layout, and construction of the mechanical system is partially completed.

Mock-ups have been made of the following:

1. Scan system

2. Tripod arrangement

3. Bellows system

4. R-T mirror switching system.

As a result of studying the mock-ups, modifications are being made in the final designs of the various components of the mechanical system. In addition we are fabricating certain parts at the present time.

Construction of the case is also partially completed.

It is expected that all mechanical design and layout work will be completed within the next ten days, and that the remainder of the parts will be fabricated by January 5, 1955.

PROGRAM FOR NEXT INTERVAL:

It is expected that the period from now to January 10, 1955 will see the completion and test of the first design approval model. Anticipating that this model will be satisfactory with only minor adjustments, we plan on completing the three additional design approval models by February 10, 1955.

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Report prepared by:

Report approved by:

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